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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/075,293	02/15/2002	Ching-Fa Yeh	YEHC3010/EM	8986

7590 09/08/2003

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EXAMINER
TRINH, HOA B

ART UNIT	PAPER NUMBER
2814	

DATE MAILED: 09/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/075,293	YEH ET AL.	
	Examiner	Art Unit	
	Vikki H Trinh	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 June 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *25-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *25-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 25-26, 31-33, 38-39, 45, are rejected under 35 U.S.C. 102(e) as being anticipated by Yu et al. (6,187,663).

As to claims 25, 32, 39, Yu et al. (6,187,663) discloses a sandwich dielectric structure having a first dielectric layer 3 having a thickness within 100-700nm formed on a substrate; a silica layer 4 having a thickness of 100nm formed on the first dielectric layer 3; and a second dielectric layer 6 having a thickness within 100-700 nm formed on the silica layer . See column 3, lines 23-66 and figure 6.

The examiner notes that the term "LPD" has been considered, but it's not structurally distinguished over the applied art. Because the patentability of a product does not depend on its

method of production. "*If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.*" See *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

As to claims 26, 33, the first and second dielectric layers are made from HSG. See column 3, lines 23-66.

As to claim 31, 38, 45, the summation of the thickness of the first and second dielectric layers is within the range of 800-1200 nm. See column 3, lines 25-66.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 27, 33-34, 40-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yu et al. (6,187,663) in view of Shields et al. (6,492,257).

Yu et al. (6,187,663) discloses the invention substantially as claimed. However, Yu et al.does not teach the dielectric layers 3,6 made from MSG.

Shields et al. (6,492,257) discloses a structure having a dielectric layer 12 made from MSG or HSG. See column 6, lines 50-53.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the material of the dielectric layers of Yu et al. with MSG, as taught by Shields et al., for reducing interconnect capacitance and increasing the integrated circuit speed. See column 2, lines 60-65.

4. Claims 29-30, 36-37, 43-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yu et al. '663 .

As to claims 28- 29, 35-36, 42- 43, Yu et al. '663 discloses the invention substantially as claimed. However, Yu et al. '663 does not explicitly teach the specific concentration of nitrogen and fluorine in the silica layer when the silica layer 4 is subjected to nitrogen plasma treatment. Nevertheless, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the invention of Yu et al. with the specific range of concentration for the nitrogen and fluorine in the silica layer, since it is prima facie obvious to an artisan's experimentation and optimization because applicants have not established any criticality for the specific range.

With respect to claims 30, 37, 44, though Yu et al. does not explicitly disclose the silica layer 4 having the thickness range of 10-30 nm, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the invention of Yu et al. with the specific range of thickness for the silica layer, since it is prima facie obvious to an artisan's experimentation and optimization because applicants have not established any criticality for the specific thickness as claimed in claims.

> The courts have concluded that there is no requirement that a motivation to make the modification be expressly articulated. The test for combining references is what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art. In re McLaughlin, 170 USPQ 209 (CCPA 1971). Also, references are evaluated by what they suggest to one versed in the art, rather than by their specific disclosures. In re Bozek, 163 USPQ 545 (CCPA 1969).

Response to Arguments

4. Applicant's arguments filed 06/13/03 have been fully considered but they are not persuasive.

In the remarks, applicant alleges that reference '663 does not meet the limitations of claim 25, because claim 25 of the present application *only* recites one layer between the two dielectric layers. (*emphasis*) Yet, the examiner notes that applicant fails to state in said claim 25 that only one layer is placed between the two dielectric layers. Thus, reference '663 meets the language of the present claim 25.

Furthermore, applicant alleges that reference '663 does not meet the thickness limitation of the present claim 25. The examiner notes that the reference '663 discloses a thickness range for layer 4 to be at least 100nm and for layer 5 to be at most 100 nm. In essence, the thickness of each layer in the reference '663 meets the limitation for the thickness of the present claim 25 when the thickness in said claim 25 is at 100 nm.

With respect to the term "LPD", LPD directs to a particular process. The examiner notes that the preamble of the claim 25 directs to an apparatus, rather than a method. Thus, it is treated as product by process claim. However, applicant attempts to distinguish the present claim 25 from reference '663 by stating that "the present invention used a techniques to reduce stress of a thick spin-on dielectric layer by forming a sandwich dielectric structure, wherein a first dielectric layer is formed on a substrate by spin coating, a liquid phase deposited (LPD) flourosilicate glass (FSG) layer is formed on the first dielectric layer and a second dielectric layer is formed on the LPD silica layer by spin coating. The LPD silica layer can be further subjected to a nitrogen plasma treatment so that the whole FSG film is nitridized to prevent movable ions from

penetrating through, and enhance thermal stability and anti-water migration ability ..." Yet, the examiner notes that applicant fails to include the statements above in the present claim 25. Therefore, the rejection for claim 25 is proper.

As to claim 27, the examiner states in the Office Action that Shield et al. cures the deficiency in Yu et al., because Shield et al. teaches that the dielectric layer 12 is made of MSG. The examiner further provides the reference with col. 2, lines 60-65, in which Shield et al. provides the motivation for doing so. As to the allegation in which the reference fails to provide a motivation to remove layer 5, the examiner notes that applicant's claim 27 does not state for a remove of any layer. Thus, the rejection for claim 27 is proper, because it is not necessary for the examiner to direct applicant to the reference where the reference teaches a limitation that applicant does not explicitly claim.

As to claims 29-30, the examiner notes that applicant claims a range for the concentration. Yet, applicant has not yet provided any criticality for the range, as stated in the Office Action. Accordingly, the rejection for claims 29-30 is proper. Because it is noted that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising therefrom. *Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical.* (In re Woodruff, 919 F.2d 1575, 1578 (Fed. Cir. 1990).)

Conclusion

1. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Vikki Trinh whose telephone number is (703) 308-8238. The Examiner can normally be reached Mon-Tuesday, Thurs-Friday, 7:30 AM - 6:00 PM Eastern Time. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Mr. Wael Fahmy, can be reached at (703) 308-4918. General inquiries relating to the status of this application should be directed to the Group receptionist at (703) 308-0858. The fax number is (703) 308-2708.

Vikki Trinh,
Patent Examiner
AU 2814

LONG PHAM
PRIMARY EXAMINER